5-2 Inequalities and Triangles

Definition of Inequality-- a > b iff there is a positive number c, such that a = b + c

ex: $7 = 3 + 4$

$7 > 3$

$7 > 4$

Properties

Comparison $a > b \quad a = b \quad a < b$

Transitive If $a \gtrless b$ + $b \gtrless c$, then $a \gtrless c$

Addition/Subtraction If $a \gtrless b$, then $a+c \gtrless b+c$

Multiplication/Division

If $c > 0$ + $a > b$, Then $a \cdot c > bc$

✗ If $c < 0$ + $a > b$, then $a \cdot c < bc$

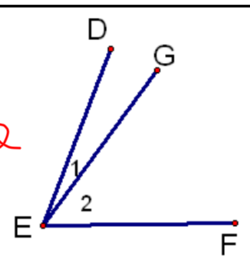
(negative)

Ex:

$LN = LM + MN$

$LN > LM$
$LN > MN$ } def of ineq.

Ex:

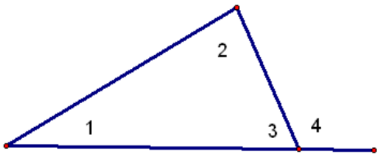


$m\angle DEF = m\angle 1 + m\angle 2$

$m\angle DEF > m\angle 1$

$m\angle DEF > m\angle 2$

Ex:



$m\angle 4 = m\angle 1 + m\angle 2$

$m\angle 4 > m\angle 1$

$m\angle 4 > m\angle 2$

Thm. 5.8 Exterior Angle Inequality Theorem --The ext. angle of a triangle is greater than either of its corresponding remote interior angles

Which angle is the largest? $\angle 1$

(Figure is not drawn to scale.)

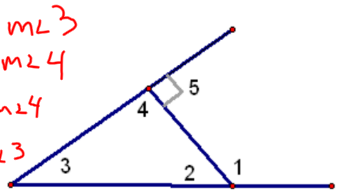
$m\angle 1 > m\angle 3$

$m\angle 1 > m\angle 4$

$m\angle 5 = m\angle 4$

$m\angle 5 > m\angle 3$

$m\angle 5 > m\angle 2$



What angles measure less than angle 14? (Figure is not drawn to scale.)

$m\angle 4$

$m\angle 11$

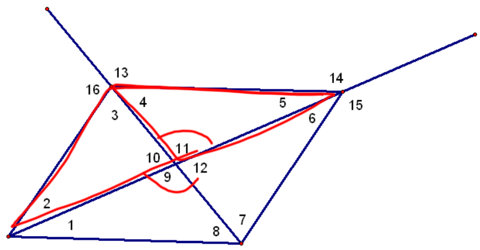
$m\angle 3$

$m\angle 2$

$m\angle 9$

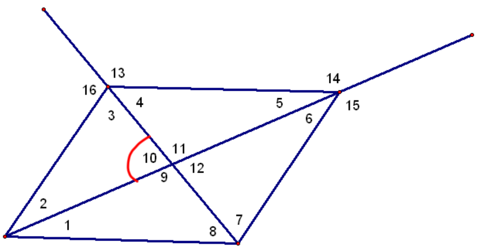
$m\angle 6$

$m\angle 7$



What angles measure greater than angle 15?

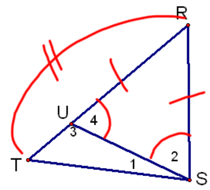
(Figure is not drawn to scale.)



m∠10
m∠13
m∠12
m∠16
m∠15

Given: ΔRST
RU = RS
RT > RS

Prove: m∠RST > m∠T

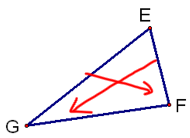


S.	R.
① ———	① Given
② m∠4 = m∠2	② I△thm
③ m∠RST = m∠1 + m∠2	③ ∠ + Post.
④ m∠RST > m∠2	④ def of Inequ.
⑤ m∠RST > m∠4	⑤ Subst.
⑥ m∠4 > m∠T	⑥ Ext ∠ Ineq thm.
⑦ m∠RST > m∠T	⑦ Transitive

Theorem 5.9--If one side of a triangle is longer than another side, then the angle opposite the longer side has a greater measure than the angle opposite the shorter side.

If GE > EF

then m∠F > m∠G

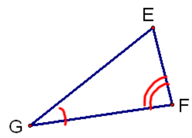


Theorem 5.10--If one angle of a triangle is larger than another angle, then the side opposite the larger angle has a greater measure than the side opposite the shorter angle.

Converse

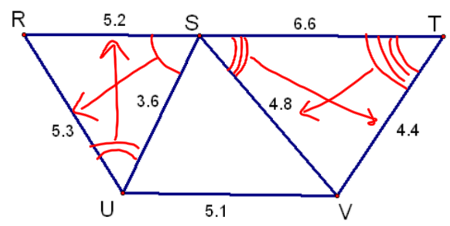
If m∠F > m∠G

then GE > EF



1. Which is greater, m∠RSU or m∠SUR?

2. Which is greater, m∠TSV or m∠STV?



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